Assessment of the Relationship Between Macronutrient Intake and Browning of White Fat in Adult Males: 3441 Board #346 June 2 3

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Research conducted in rodents and humans present conflicting results on the relationship between caloric intake and the browning of subcutaneous white adipose tissue (scWAT). For example, exercise combined with caloric restriction did not change browning indices measured from human scWAT samples. In another study, caloric restriction in mice resulted in the browning of both scWAT and visceral white adipose tissue. Few investigators, however, have examined the relationship between differences in macronutrient intake and browning processes of human scWAT.
PURPOSE: The purpose of this study was to investigate the relationship between macronutrient intake and browning indices assessed from scWAT of healthy adult males.
METHODS: Forty-six healthy adult males [age (years): 35.2±6.9, body mass index (BMI): 27.3±4.2 (kg/m2)] completed a 3-day dietary recall within one week, and had a scWAT biopsy done to assess the mRNA of uncoupling protein one (UCP1) - a direct measure of browning processes. mRNAs of peroxisome proliferator-activated receptor gamma coactivator 1-alpha (PGC-1α), peroxisome proliferator-activated receptor alpha (PPARα) and peroxisome proliferator activated receptor gamma (PPARγ) that indirectly indicate browning processes of scWAT were also assessed. Carbohydrate (CHO), protein (PRO), and fat (FAT) intake data as a percentage of total caloric intake were used for analysis. Waist-to-hip ratio, body composition, and resting energy expenditure were also measured.
RESULTS: Spearman's correlation coefficient revealed a moderate positive association between CHO and PPARγ (rho= 0.375, p= 0.01). CHO was also negatively associated with fat mass (assessed as a percentage of total body mass) (rho= -0.297, p= 0.04). No other significant associations were detected ($p > 0.05$).
CONCLUSIONS: Carbohydrate intake as a percentage of total kilocalories was positively associated with PPARγ in scWAT from healthy adult males. It is, however, difficult to determine if the association between carbohydrate intake and PPARγ indicates browning processes in scWAT given that the mRNA of UCP1 was not related to macronutrient intake. More research is needed to expand on these findings with the use of longitudinal intervention-based studies.